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Euro-Experiences with Networked Distributed Resources

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*E **SOURCE** Distributed Energy Service*

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DE C&C is Alive and Well in Europe

- A short tour across the seas…
  - Euro Union Research : Dispower
  - United Kingdom: ENER.G
  - Netherlands: Nuon
  - Germany: Siemens DEMS
  - Germany: Vaillant
  - Germany: EWE

European Union Research: Dispower Work Package 5

- Information, communication and electricity trading research project
  - Internet based network and info pools
  - Emphasis is on low voltage grid and grid stability.
  - Plan a mix of centralized and distributed intelligence
  - Leaning toward low bandwidth powerline-sideband communication
  - Not heavily funded; will work with channels others develop
  - See http://applik-9.iset.uni-kassel.de/

ENER.G: Managing 500+ DG Units Remotely

- Operate and/or maintain ~550 DG units in the UK – With 25 people
- Core value in comm and control, with best-in-field DG O&M experience
- Remote engine management system
  - Focus primarily on monitoring operation for reliability – Most systems baseload cogen
  - But can change operating schedule remotely; could dispatch systems for peak
- Happy with dedicated phone lines, but migrating to web-based control system

The Netherlands' Nuon: Dispatching Greenhouses…

- Operates around 500 gas engines at customers sites.
  - 50% Green house cogen / 50% other cogen
- The Dutch power market is quite volatile – prices have reached €750/MWh.
- This makes it worth Nuon's while investing in a communication and dispatch system.
- Nuon believes they are the only Dutch utility operating small scale cogen units in this way

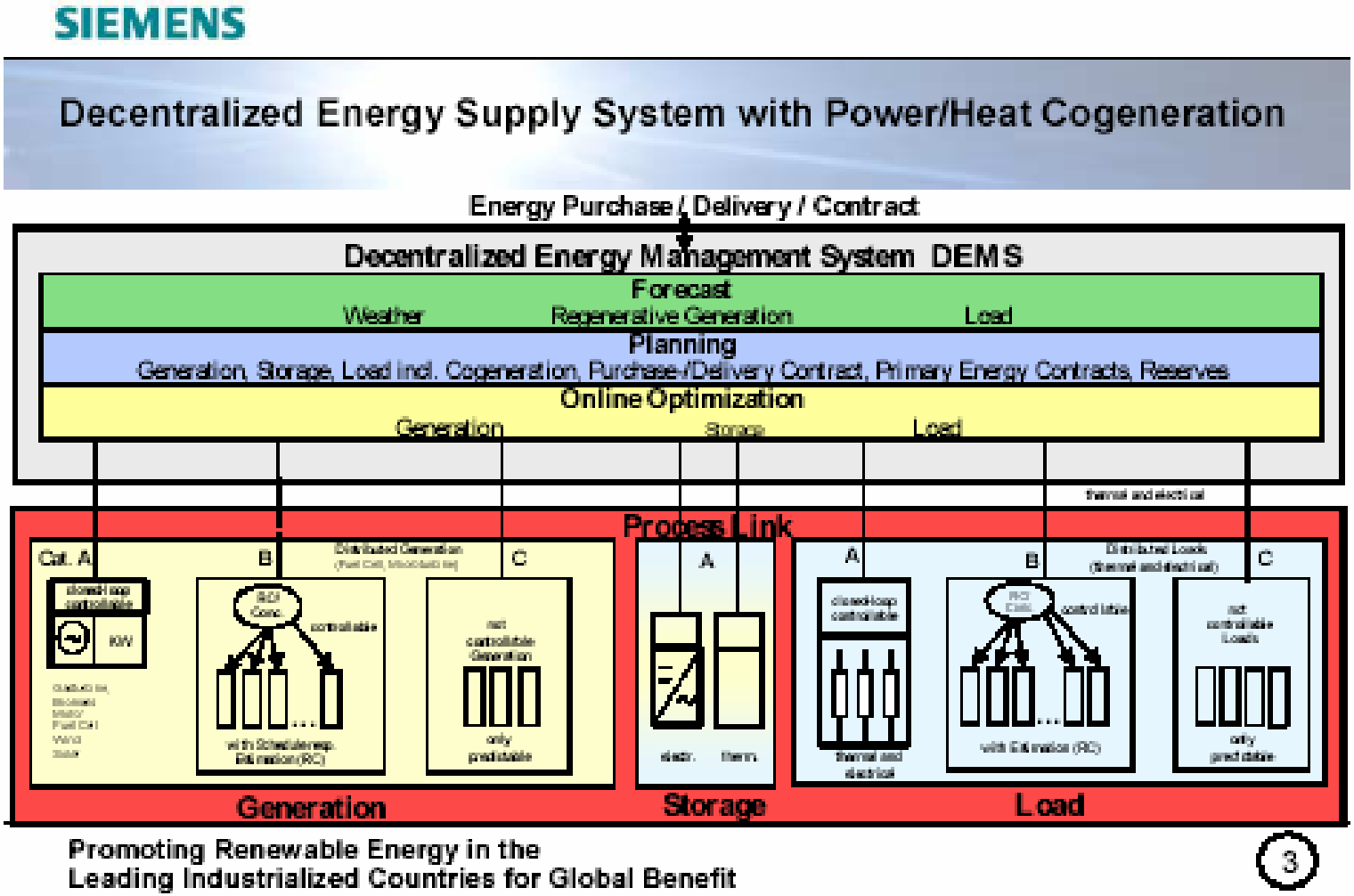
Nuon's Infrastructure

- Nuon evaluated options for a communication system that would enable them to dispatch these gas engines:
  - Needs to be able to communicate every 15 minutes with the gas engine, for start/stop and kWh generated data.
- Communication system chosen by Nuon was cellular communication using RAM mobile.
  - Hardware had to be fitted to each engine (interfacing with the existing control system on the engine).

The Decentralized Energy Management System (DEMS): Concepts

- DEMS is a Siemens product
- DEMS goal is to optimize the cost of energy supply on the medium voltage network.
  - Forecasts ahead using weather and other patterns and then adjusts both demand and supply online
  - Does not optimize power flows on the grid
- DEMS is not wedded to any particular comm hardware; talks via TCP-IP, XML messages
  - Variable communication functionality for different types of generators and loads under control

DEMS Example: CHP System Structure



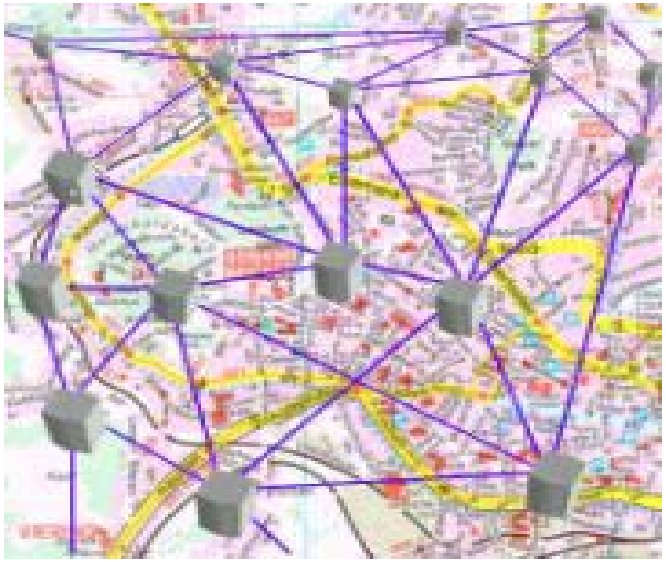
Source: Siemens, Dr. Rainer Bitsch

Valliant: The "Virtual Fuel Cell Power Plant"

- 40-Month project, co-funded by the European Commission
- Installed 3 units last year. Expect 6-7 this year. Goal is ~400 total
- Centrally controlled and grid connected fuel cells
- Use for peaking supply

Project Phases:

- Environment Analysis
- Basic & detail engineering
- Procurement
- Production of Test Units
- Preparation of Field Test
- Field Demonstration Test
- Dissemination Strategy



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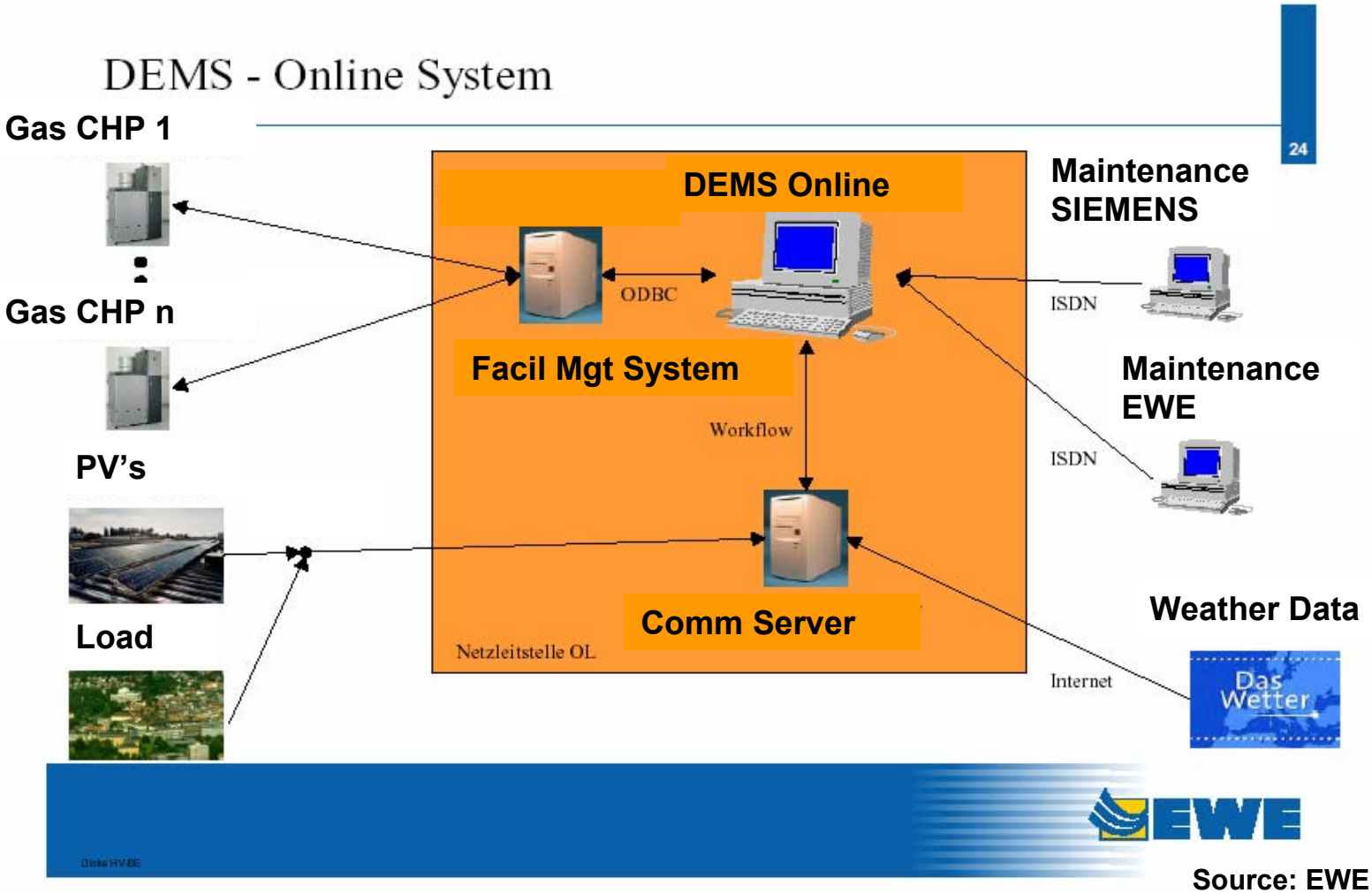
Valliant: C&C Issues

- For initial field tests (~the first 50 units), Vaillant will communicate with every unit
- This will require a low bandwidth dedicated channel.
- Long term, reduced communication planned:
  - request changes in the autonomously controlled operating pattern of the fuel cell
  - sound alarms if the unit is not operating correctly and requires some maintenance
- Vaillant looking at a range of communication modes

EWE's Application of DEMS for Vaillant and Sulzer Hexis FC's

- EWE has built a C&C system for their small scale fuel cell units
- They have 16 Sulzer-Hexis up. 34 by year's end. Now installing 2 Vaillant-Plug Power FCs
- Custom interface communicates with all their Sulzer-Hexis and Vaillant FC systems
- Use it to receive the information from operations (metering data, alarms, etc.) and to send demand profiles from our DEMS-system
- Phone-line based (small number of units)

EWE's DEMS System



Source: EWE

Like more information?

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